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10/617,547	07/10/2003	Lawrence R. Plotkin	10010828-1	4281

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EXAMINER

ECHELMAYER, ALIX ELIZABETH

ART UNIT	PAPER NUMBER
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1745

MAIL DATE	DELIVERY MODE
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07/30/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/617,547	Applicant(s) PLOTKIN, LAWRENCE R.	
	Examiner Alix Elizabeth Echelmeyer	Art Unit 1745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 May 2007.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18, 27-50 and 73-94 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-18, 27-50 and 73-94 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

1. This Office Action is in response to the amendment filed May 8, 2007. Claims 1, 3, 5, 8, 13, 27, 33, 37, 38 and 47 have been amended. Claims 19-26 and 51-72 have been cancelled. Claim 94 has been added. Claims 1-18, 27-50 and 73-94 are pending and are rejected for the reasons given below.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1-13, 27-40, 43, 44, 46-50, 76, 81, 86 and 92 are rejected under 35 U.S.C. 102(e) as being anticipated by Kindler et al. (US Patent 6,440,594).

Regarding claims 1, 2, 5, 27-29, 39, 40, 48 and 49, Kindler et al. teach a direct oxidation fuel cell system comprising a plurality of anodes, cathodes and electrolyte and a fuel reservoir. The fuel is provided to the anode by an aerosol generator, or fuel ejector, located within the anode chamber of the fuel cell. The fuel is provided as an aerosol of liquid fuel droplets suspended in a gas. The aerosol generator may use one or two fluid nozzles (abstract; Figure 1; column 1 lines 64-67; column 2 lines 1-11).

The amount of fuel delivered to the anode depends on the particular oxidation catalyst used in the anode, the permeability of the membrane, the fuel concentration in the droplets, and the temperature and pressure within the cell. The fuel amount delivered is controlled by a controller, such as a digital or analog computer (column 7 lines 62-67; column 8 lines 1-4).

Regarding claims 3, 4, 33, 34, 38, 43, 44, 48 and 49, Kindler et al. teach removing a byproduct of the reaction to be returned to the cell (Figure 1), and that the fuel delivered to the electrochemical cell is provided in a stoichiometric relationship appropriate for the function of the electrochemical reaction (column 10 lines 13-32).

As for claims 6-9 and 47, Kindler et al. teach a tank for methanol that also receives the exhaust from the fuel cell (column lines 26-46). Kindler et al. do not specifically teach that the byproduct would mix with the fresh fuel, but it is the position of the examiner that this mixing would occur inherently, as liquids are known to mix with each other. MPRP 2112.02

Regarding claims 10-13, 76, 81, 86 and 92, Kindler et al. teach a plurality of in situ atomizers or ejectors (column 15 lines 66-67; column 16 lines 1-10).

With regard to claims 30, 32, 36, 37, and 50 Kindler et al. teach a recovery tank within the fuel cell system in addition to the tank for fresh fuel (Ref. 19 of Figure 1; column lines 26-46).

With regard to claim 31, Kindler et al. teach bottled oxygen for the cathode side of the fuel cell reaction (column 5 lines 51-54; reference 26 in Figure 1).

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As for claims 35, Kindler et al. teach a sensor for monitoring the functions of the fuel cell. The input from the sensors is used to control the fuel delivered to the fuel cell (column 7 lines 61-67; column 8 lines 1-4).

Regarding claim 46, Kindler et al. teach the ratio of byproduct to fuel may be controlled by the amount of fuel delivered to the fuel cell. Since the controller of Kindler et al. monitors the cell output or power, it can monitor the amount of fuel being consumed. By controlling the fuel delivered to the fuel cell, it would inherently control the amount of unreacted fuel byproduct (column 7 lines 62-67; column 8 lines 1-4).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 14-18, 41, 42 and 45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kindler et al. in view of Takahashi (US Patent 5,746,985).

The teachings of Kindler as discussed above are incorporated herein.

Kindler et al. teach the electronically controllable drop ejection device of the instant invention but fail to teach a resistor coated with a catalytic material.

Takahashi teaches a heating resistor, excellent in heat transmission, inside a fuel-reforming device. The resistor is further embedded in a catalyst, which allows heat

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to be transmitted to the catalyst more efficiently, causing the reaction to start more rapidly (column 2 lines 63-67; column 3 lines 1-6).

It is taught by Takahashi that using a resistor embedded in a catalyst is desirable since it is more efficient and causes the reaction to occur more rapidly than the system of Kindler et al.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to combine the fuel-mixing chamber of Kindler et al. with the resistor embedded in a catalyst of Takahashi in order to make a more efficient system in which the reaction of the fuel occurs more rapidly.

6. Claims 73-75, 78-80, 84-85, and 89-91 and 94 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kindler et al. as applied to claims 1, 27, 43 and 48 above, and further in view of Scheifler et al. (US Patent 6,372,483).

Kindler et al. teach a drop ejection device for providing fuel to an electrochemical cell but fail to teach that the device is an inkjet, thermal or piezoelectric drop ejection device.

Scheifler et al. teach dispensing fluids, and further teach that inkjet ejectors, such as thermal or piezoelectric ejectors are commonly used to dispense droplets of fluids (column 3 lines 37-56).

It would be advantageous to use any of an inkjet, thermal or piezoelectric drop ejection device in the fuel cell system of Kindler et al. that, as taught by Scheifler et al., are all commonly used to dispense droplets of fluid, since this variety of possible

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ejectors leads one to have a variety of options of ejectors to assemble the fuel cells depending on which ejectors are available or less costly.

Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention to use any of an inkjet, thermal or piezoelectric drop ejection device in the fuel cell system of Kindler et al. that, as taught by Scheifler et al., are all commonly used to dispense droplets of fluid, since this variety of possible ejectors leads one to have a variety of options of ejectors to assemble the fuel cells depending on which ejectors are available or less costly.

7. Claims 77, 82, 88 and 93 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kindler et al. as applied to claims 1, 27, 43 and 48 above, and further in view of Bushman (US 5,667,649) and Lee et al. (US 5,789,585).

The teachings of Kindler et al. as discussed above are incorporated herein.

Kindler et al. fail to teach a stainless steel anode and transition metal cathode.

Bushman teaches a stainless steel anode for a fuel cell (column 2 lines 41-53).

Bushman further teaches that the stainless steel anode is desirable because it resists pitting and corrosion (column 2 lines 35-38).

It would be desirable to use the stainless steel anode of Bushman in the fuel cell of Kindler et al. since it resists pitting and corrosion.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use the stainless steel anode of Bushman in the fuel cell of Kindler et al. since it resists pitting and corrosion.

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Lee et al. teach a transition metal oxide cathode (column 6 lines 57-58).

Lee et al. further teach that the transition metal oxide cathode maintains electrical conductivity.

It would have been desirable to use the cathode of Lee et al. in the fuel cell of Kindler et al. since it maintains electrical conductivity.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use the cathode of Lee et al. in the fuel cell of Kindler et al. since it maintains electrical conductivity.

Response to Arguments

8. Applicant's arguments filed May 8, 2007 have been fully considered but they are not persuasive.

Regarding the argument on pages 15-17 of the Remarks, Applicants state that an aerosol is not the same as a jet, since a jet emits a measured stream of droplets. The examiner is not convinced. The stream of the aerosol of Kindler et al. is controlled, or measured, by the amount of fuel that it is provided and the size and number of nozzles. Further, since an aerosol is, in the definition provided by Applicants, liquid particles in gas. A stream from a jet is also liquid particles in gas, unless the jet is being administered in a vacuum.

Next, Applicants argue that unused fuel is not a byproduct of the fuel cell reaction. The examiner strongly disagrees. Just because the unused fuel is not created

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in the reaction does not mean it is not a byproduct. Unused fuel is a product of an electrochemical cell, since it leaves the cell following the reaction.

Regarding the arguments on page 19 concerning claim 4, Kindler et al. teach the provision of fuel in a stoichiometric relationship (column 10 lines 13-33).

As for claims 6 and 10, the liquid fuel is admixed with the gas in which it is suspended, since, as Applicants have pointed out, a gas is needed in an aerosol to suspend the liquid (or solid).

Claim 31 is addressed in the 102 rejection above, and is taught in Kindler at column 5 lines 51-54, reference 26 in Figure 1.

Claim 46 is addressed in the 102 rejection above, and is taught in Kindler at column 7 lines 62-67 and column 8 lines 1-4.

Regarding the rejection of Kindler et al. in view of Takahashi, Applicants argue that the heating resistor of Takahashi is taught in a reforming reactor, and not a drop ejection device.

The instant invention claims a resistor in a catalyst, and that the catalyst is reactive with a component in the chemical in the oxidative reaction. By reacting the oxidant chemical with a resistor covered in a catalyst, a reforming reaction occurs. Thus, the jetting device of the instant invention becomes a reforming reactor.

9. Applicant's arguments with respect to claims 77, 82 and 88 have been considered but are moot in view of the new grounds of rejection.


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Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alix Elizabeth Echelmeyer whose telephone number is 571-272-1101. The examiner can normally be reached on Mon-Fri 7-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Susy N. Tsang-Foster can be reached on 571-272-1293. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.


RYAN
SUPERVISORY PATENT EXAMINER

Alix Elizabeth Echelmeyer
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Art Unit 1745

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